UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101

AIR AND RADIATION
DIVISION

April 1, 2022

Mr. Ali Mirzakhalili
Air Quality Division Administrator
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232-4100

Dear Mr. Mirzakhalili:

This letter is in response to the Oregon Department of Environmental Quality submission sent August 12, 2021, regarding the elevated 24-hour PM_{10} concentrations measured at the monitoring site in Oakridge, Oregon (AQS site number 41-039-2013) between September 11 and September 16, 2020. Oregon has requested that the U.S. Environmental Protection Agency concur that these elevated PM_{10} concentrations on these six days at the Oakridge monitoring station in September 2020 were caused by exceptional events due to wildfire emissions.

In 2016, the EPA revised the Exceptional Events Rule found in 40 CFR 50.1, 50.14 and 51.930. See "Treatment of Data Influenced by Exceptional Events" rule (81 FR 68216, October 3, 2016). The 2016 rule revisions at 40 CFR 50.14(a)(l)(i) limit the applicability of the Exceptional Events Rule to exceedances or violations of the National Ambient Air Quality Standards that have relevance to specific regulatory determinations by the EPA, or otherwise as approved by the EPA administrator on a case-by-case basis. The EPA has reviewed the documentation provided by Oregon to demonstrate that Oregon has met the procedural requirements and technical criteria for exceptional events in the Exceptional Events Rule for the elevated PM10 concentrations recorded at the Oakridge monitoring station from September 11 to September 16, 2020.

After careful consideration of the information provided, we concur, based on the weight of evidence, that Oregon has made the demonstrations referred to in 40 CFR 50.14(a)(2) and (b)(1) for the days that Oregon requested the EPA concurrence. Oregon has met the schedule and procedural requirements in 40 CFR 50.14(c) with respect to the same information. The basis for our concurrence is set forth in the enclosed technical support document. My staff has entered or will shortly enter a "concurrence flag" for this data into the EPA's Air Quality System data repository.

The EPA's concurrence is a preliminary step in the regulatory process for actions that may rely on the dataset containing the event-influenced data and does not constitute final agency action. When the EPA takes a regulatory action that is affected by exclusion of the PM_{10} data for the exceedances that occurred at the Oakridge monitoring station from September 11 to September 16, 2020, the EPA intends to publish notice of its proposed action in the Federal Register. The EPA's concurrence letter and accompanying technical support document will be included in the record as part of the technical basis

for that proposal. When the EPA issues that regulatory action, it will be a final agency action subject to judicial review.

Thank you for Oregon's submission of this exceptional events documentation. If you have any questions or wish to discuss this matter further, please contact me or have your staff contact Claudia Vaupel, Air Planning Section, at (206) 553-6121.

Sincerely,

KRISHNASWAMY VISWANATHAN

Digitally signed by KRISHNASWAMY VISWANATHAN
Date: 2022.04.01 12:15:37 -07'00'

Krishna Viswanathan
Director

Enclosure

cc: Mr. Michael Orman
Oregon DEQ

Ms. Margaret Miller
Oregon DEQ

Mr. Anthony Barnack
Oregon DEQ

EPA, Region 10
Technical Support Document

Review of Exceptional Event Request
Oakridge, OR
PM_{10} NAAQS
Dates Analyzed: September 11-16, 2020

Background

On October 3, 2016, the U.S. Environmental Protection Agency published a final rule, *Treatment of Data Influenced by Exceptional Events*, with an effective date of September 30, 2016, (Exceptional Events Rule or EER at 81 FR 68216). The 2016 Exceptional Events Rule governs the review and handling of certain air quality monitoring data for which the normal planning and regulatory processes are not appropriate and revises the rule initially adopted by the EPA on March 22, 2007 (72 FR 13560). Under the Exceptional Events Rule, the EPA may exclude data from use in determinations of National Ambient Air Quality Standard (NAAQS) exceedances and violations if a state demonstrates that an "exceptional event" caused the exceedances. Before the EPA can exclude data from these regulatory determinations, the state must notify the EPA Administrator of its intent to exclude data by flagging the data in the EPA's Air Quality System database and engaging in the initial notification process. After notice and opportunity for public comment at the state level, the state must submit a demonstration to justify the exclusion. After considering the weight of evidence provided in the demonstration, the EPA decides whether the requirements for concurring on the flag have been met. Final action on the data exclusion does not occur until it is acted upon as part of a final regulatory action subject to public notice and comment.

Oregon Department of Environmental Quality Request

Oregon requested concurrence on flagged 24-hour PM_{10} concentrations that occurred from September 11 to 16, 2020, at the Oakridge, Oregon monitoring station (AQS site ID# 41-039-2013). Table 1 shows recorded PM_{10} concentrations for which Oregon requests the EPA's concurrence.

Table 1. PM_{10} concentrations for which Oregon requests the EPA's concurrence.

Date	24-hour average PM_{10} ($\mu g/m^3$) EPA # 41-039-2013
9/11/2020	274
9/12/2020	591
9/13/2020	423
9/14/2020	305
9/15/2020	314
9/16/2020	237

Oregon flagged the monitored values as due to a wildland fire exceptional event. The agency made the documentation available for public comment for 30 days starting on June 30, 2021. The comment period closed on July 30, 2021, and Oregon did not receive any comments. Oregon submitted the exceptional event demonstration package to the EPA on August 12, 2021. Oregon requests concurrence from the

EPA for the flagged days, based on Oregon's conclusion that the dates at the Oakridge monitoring station have regulatory significance for redesignating the Oakridge nonattainment area to attainment for the PM_{10} 24-hour standard and approving the associated 10-year maintenance plan.

The EPA's Exceptional Event Evaluation

The EPA agrees with Oregon that the PM_{10} exceedances from September 11 to September 16, 2020, at the Oakridge monitoring station have regulatory significance for purposes of the Oakridge PM_{10} redesignation and 10-year maintenance plan. Although Oregon's analysis indicates September 7 to September 18 were affected by wildfire smoke (see below), the 2016 rule revisions at 40 CFR 50.14(a)(l)(i) limit the applicability of the EER to NAAQS exceedances or violations that have relevance to specific regulatory determinations by the EPA or otherwise as approved by the EPA administrator on a case-by-case basis. As noted in the table below, the design value[1] at the Oakridge monitoring station attains the PM_{10} NAAQS once the September 11 to September 16 data is excluded from consideration. To attain the PM_{10} 24-hour NAAQS, monitored values for the area must not exceeded 150 $\mu g/m^3$ more than once per year on average over 3 years.

Table 2. Daily PM_{10} concentrations Oregon flagged for EPA concurrence because of their effect on the 2018-2020 design value, and the resulting 3-year average design value if they are excluded.

Date	24-hour average PM_{10} ($\mu g/m^3$)	Data flag	Resulting 3-year average design value if daily value (and all above) are removed from dataset ($\mu g/m^3$)	Percent of standard
9/12/2020	591	RT	2.4	240%
9/13/2020	423	RT	2.1	210%
9/15/2020	314	RT	1.7	170%
9/14/2020	305	RT	1.4	140%
9/11/2020	274	RT	1.1	110%
9/16/2020	237	RT	0.7	70%

Below is a summary of the requirements of the Exceptional Events Rule and a description of how Oregon met each requirement. All references to page numbers, tables, and figures relate to Oregon's August 12, 2021, submission.

Procedural requirements

- **The state must notify the EPA of its intent to request exclusion of data as due to an exceptional event by creating an initial event description, flagging the associated data in the EPA's AQS database, and engaging in the Initial Notification of Potential Exceptional Event Process. 40 CFR 50.14(c)(2)(i).**

In the EPA's AQS database, Oregon flagged the 24-hour PM_{10} values for the days between September 11 and September 16, 2022, as due to wildland fire exceptional events. Oregon met the Exceptional Event Initial Notification requirements through multiple EPA - Oregon calls and via email on March 29, 2021. Thus, Oregon has met the Initial Notification and Flagging requirements for this demonstration.

[1] To attain the PM_{10} 24-hour NAAQS, monitored values for the area must not exceeded 150 $\mu g/m^3$ more than once per year on average over 3 years (i.e., less than or equal to 1).

- **The public had an opportunity to review and comment on the demonstration justifying data exclusion; any public comments received by Oregon were included in the demonstration; and the demonstration addresses those comments disputing or contradicting factual evidence provided in the demonstration. 40 CFR 50.14(c)(3)(v).**

Oregon provided a 30-day public comment period on the documentation for the claimed exceptional event. The public comment period was open from July 30, 2021, to August 30, 2021. Oregon did not receive any comments during the public comment period. Thus, Oregon has met the public comment requirements for this demonstration.

Technical Criteria

- **The demonstration includes a narrative conceptual model that describes the event as provided in 40 CFR 50.14(c)(3)(iv)(A).**

Oregon explained that in 2020, there were extensive wildfires throughout Oregon, Washington, and Idaho. Oregon noted that persistent warmth and very low rainfall in the second half of the summer in 2020 boosted fire danger sufficiently to make many areas more susceptible to fires by late August and early September. Daily values of minimum relative humidity and corresponding overnight recoveries maintained a worsening trend from late August through mid-September, falling steadily below average. Oregon also noted that a few lightning-caused large fires helped set the stage for the fire outbreak that was caused by a historic windstorm in early September.

Oregon stated that on September 7 and 8, 2020, a strong dry cold front moving south from Canada pushed across the northwest region of the United States bringing record-breaking strong winds and low relative humidity to much of the region. The cold front was concentrated mainly in western Washington and most of northwest Oregon, where rainfall totals went well above normal for the month of September. However, eastern Washington, eastern Oregon, and southwest Oregon did not accumulate as much precipitation and rainfall totals remained below average for the month of September.

Oregon explained that the cold front accelerated the already busy fire activity in the region. The resulting fast-moving firestorms in timber, brush, and grasses burned over 1.76 million acres on new and existing large fires across the geographic area from September 7 through September 13, during and shortly after the wind event. Fire activity was well above average for the region for September, both in terms of numbers of fires and acreage burned; 90 percent of acres burned in the geographic area in 2020 occurred during September. Strong winds diminished in the aftermath of the cold front, but the dry air and heavy smoke lingered over the next 10 days and covered regions on both sides of the Cascade mountain ranges with unhealthy air quality and poor visibility until several Pacific frontal systems brought rain on September 18, and again on September 24. Oregon stated that temperatures in the Northwest during the 2020 wildfire season were significantly higher than normal and average precipitation was lower than average.

According to Oregon, the wildfire smoke events in Oakridge started on September 7, 2020, with smoke from the Holiday Farm Fire, and on September 9, 2020, with smoke from the Thielson Fire. From September 10 through September 18, 2020, the smoke from multiple fires mixed and settled over the western parts of Oregon, including the Willamette Valley and Oakridge.

Oregon's submission provides a detailed description of the claimed exceptional events, with multiple wildfires occurring throughout the Western U.S., and the meteorological conditions that allowed for the transport and build-up of PM_{10} from these extensive wildfires. The EPA concludes that the submitted demonstration satisfies the conceptual model criteria.

- **The event meets the definition of a "wildfire" in 40 CFR 50.1(n). Also, the event satisfies the "unlikely to recur at a particular location or a was natural event" criteria in 40 CFR 50.14(c)(3)(iv)(E).**

A "wildfire" is defined in the Exceptional Events Rule as "any fire started by an unplanned ignition caused by lightning; volcanoes; other acts of nature; unauthorized activity; or accidental, human-caused actions, or a prescribed fire that has developed into a wildfire. A wildfire that predominantly occurs on wildland is a natural event." "Wildland" is defined as an area in which human activity and development are essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered." A "natural event" is described as "an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role." See 40 CFR 50.1.

Oregon's submission explains that the "natural events" were extensive wildfires that were occurring throughout the Western U.S. The wildfires followed a rare and powerful wind event that erupted on September 7, 2020, bringing dry, hot winds, up to 75 miles per hour, that quickly spread any fire that started or was already burning.

Additionally, Oregon evaluated other source category emissions, including prescribed fires, agriculture burning, residential wood combustion (RWC), open burning, and vehicle emissions. Oregon notes that there were no prescribed fires in Oakridge during the impacted monitor days and open burning was also not permitted during the impacted monitor days. Oregon further states that RWC would likely not occur due to the high temperatures in Oakridge during the impacted monitor days. Also, vehicle emissions and road dust were not likely contributors on the event days because of the relatively small fraction of emissions resulting from vehicle traffic in these rural areas.

Oregon's submission supports the conclusion that the event meets the definition of a "wildfire" and meets the definition of a "natural event" in the Exceptional Events Rule.

- **The event satisfies the "clear causal relationship" criteria in 40 CFR 50.1(j); 40 CFR 50.14(c)(3)(iv)(B).**

As part of assessing a clear causal relationship between the wildfire event and the elevated PM_{10} concentrations at the Oakridge monitoring station, Oregon examined air quality monitoring data, satellite data, back trajectories, and time series data. Oregon explained that PM_{10} levels in Oakridge increased dramatically beginning September 7, 2020, when the wind direction shifted in the late evening and brought smoke from the Holiday Farm and Lionshead fires, which were to the north and northeast of Oakridge. From September 10 to September 18, 2020, the Holiday Farm, Lionshead, and Thielsen Fires combined with smoke from multiple other Oregon wildfires to inundate western Oregon with smoke, causing exceedances of the NAAQS for PM_{10} in Oakridge. The highest 24-hour average PM_{10} concentration recorded at the Oakridge air quality monitor was 591 $\mu g/m^3$ on September 12, 2020.

To provide visual evidence of the size and direction of the smoke plume on affected days, Oregon examined MODIS Terra and MODIS Aqua satellite photos (through NASA's EOSDIS WorldView). Oregon also conducted HYSPLIT back trajectory and wind rose modeling through the EPA's AirNowTech website. For each day of the combined smoke event, Oregon provided wind direction, wind speed and PM_{10} concentration time series data, and MODIS satellite images with fire and HYSPLIT back trajectory overlays.

The satellite smoke images for September 11 to 16, 2020, show thick smoke in western Oregon and around the Oakridge monitor. The back trajectories show that smoke traveled from the direction of multiple wildfires to the Oakridge air quality monitor site. The hourly times series of PM_{10} impacting the monitor, as well as the hourly changes in wind direction, match what one would expect from transported smoke from the indicated wildfires. The diurnal pattern of PM_{10} impacting the site on the requested days does not match the typical diurnal pattern of pollution from RWC sources, and daily maximum and minimum temperatures on these days, as reported in Table 6 of Oregon's submission, were well above the temperatures typically associated with use of RWC for home heating. This, along with no open burning or prescribed burning on these requested days rules out those possible sources of PM_{10}.

Based on Oregon's submission, the EPA concludes that there is a clear causal relationship between the wildfires and elevated PM_{10} concentrations recorded at the Oakridge monitoring station from September 11 to September 16, 2020.

- **The demonstration includes an analysis comparing the claimed event-influenced concentrations to concentrations at the same monitoring site at other times to support the "clear causal connection" requirement. 40 CFR 50.14(c)(3)(iv)(C).**

Oregon compared the event-influenced concentrations at the Oakridge monitor in 2020 to June – September summertime concentrations from the same monitoring site from 2016 to 2019 to support its conclusion that the wildfires affected air quality. Excluding summer wildfire influence, exceedances of the PM_{10} NAAQS in Oakridge have occurred solely in winter months and have been largely associated with home heating from RWC.

The summertime 2016 to 2019 historical PM_{10} air quality monitor data for Oakridge shows that the summer PM_{10} concentrations in 2020 were significantly higher than in the previous 4 years. In the period from 2016 to 2019, the maximum summer PM_{10} concentration was 210 $\mu g/m^3$ on September 4, 2017 and was flagged by the state as influenced by wildfires, along with several other days in September and August of 2017.[2] Aside from the 2017 high values, the next highest historical PM_{10} concentration was 76 $\mu g/m^3$ on August 21, 2018. In 2020, the maximum PM_{10} concentration reached 591 $\mu g/m^3$ on September 12.

- **The event satisfies the "not reasonably controllable and not reasonably preventable" criteria in 40 CFR 50.1(j); 40 CFR 50.14(b)(4), (b)(8), and (c)(3)(iv)(D).**

[2] Oregon noted that during the summer of 2017, PM_{10} concentrations in Oakridge were impacted by wildfire smoke that caused exceedances of the PM $_{10}$ NAAQS but did not have regulatory significance to be removed from AQS.

The Exceptional Event Rule states that "provided the Administrator determines that there is no compelling evidence to the contrary in the record, the Administrator will determine every wildfire occurring predominantly on wildland to have met the requirements identified in (c)(3)(iv)(D) of this section regarding the not reasonably controllable or preventable criterion." (40 CFR 50.14(b)(4)).

Oregon thoroughly documented through the conceptual model that there were extensive wildfires occurring in Oregon and Washington. Oregon also analyzed alternative sources that potentially could have contributed emissions and found that none were contributing significant or elevated emissions during the time of the event. The EPA is not aware of any information to the contrary. Therefore, based on 40 CFR 50.14(b)(4), the EPA determines that these wildfires were not reasonably controllable or preventable.

- **The event satisfies the "mitigation" criteria in 40 CFR 51.930.**

  40 CFR 51.930 requires that a state requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the NAAQS. At a minimum, the State must:

  1. Provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard;

  2. Provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event; and

3. Provide for the implementation of appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by exceptional events.

   To protect the public health from exceedances or violations of the NAAQS, Oregon helped to develop a wildfire response protocol, in coordination with Lane Regional Air Protection Agency, Oregon Health Authority, Oregon OSHA, Oregon Emergency Management, Oregon Department of Forestry, and the US Forest Service, that outlines the state, federal, and local response to dangerous smoke levels impacting Oregon communities. Oregon included a summary of the protocol's action areas and lead agency responsibilities as part of the submission.

   The five general actions of the wildfire response protocol include: air monitoring, smoke forecasting and modeling, issuing health warnings, managing online website communications, and taking actions to protect public health. Measuring air quality allows these agencies to track ambient air levels in communities receiving the heaviest impact. Smoke forecasting and modeling provides advance notice of possible smoke concentrations and prepare communities for smoke exposure. Issuing health warnings enables coordinated updates from environmental and public health agencies and provides a forum to communicate up-to-date health-related information. The Oregon Smoke Blog, local agency websites, and other social media communications provide the public with a "one-stop" website to share the status of wildfires, air quality levels, health risks, cleaner air locations, press releases, and other critical information. Finally, these agencies can take actions to protect public health, such as canceling public events and closing schools, planning evacuations, or providing cleaner air spaces and shelters, when smoke concentrations are at unhealthy levels for impacted communities.

The information in Oregon's submission is sufficient to demonstrate that it has met the mitigation requirements of 40 CFR 51.930. Oregon has not requested concurrence on three wildfire events/seasons within three years. Therefore, the mitigation plan requirement in 40 CFR 51.930(b) is not applicable at this time.

Conclusion

Based on the documentation submitted by Oregon on August 12, 2021, the EPA concurs with Oregon that the PM_{10} data values listed in Table 3 have regulatory significance and were due to a wildfire exceptional event.

Table 3. 24-hr PM_{10} values at the Oakridge monitoring station flagged by Oregon and concurred on by the EPA as meeting the exceptional event criteria.

Date	24-hour average PM_{10} ($\mu g/m^3$) EPA # 41-039-2013
9/11/2020	274
9/12/2020	591
9/13/2020	423
9/14/2020	305
9/15/2020	314
9/16/2020	237

The information and analyses presented in Oregon's exceptional event demonstration package provided a sufficient basis, based on the weight of evidence, for the EPA's concurrence on the flagged data from the Oakridge monitoring station on the dates listed above in Table 3 and as described in this document. Accordingly, the EPA is placing a concurrence indicator in the EPA's AQS database for these dates at this monitor.

The EPA's concurrence is a preliminary step in the regulatory process for actions that may rely on the dataset containing the event-influenced data and does not constitute final agency action. When the EPA takes a regulatory action that is affected by exclusion of the PM_{10} data at the Oakridge monitoring station from September 11 to September 16, 2020, the EPA intends to publish notice of its proposed action in the *Federal Register*. The EPA's concurrence letter and this accompanying technical support document will be included in the record as part of the technical basis for that proposal. When the EPA issues that regulatory action, it will be a final agency action subject to judicial review.